



Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, DC 20515

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March 3, 2023

SUMMARY OF SUBJECT MATTER

TO: Members, Subcommittee on Railroads, Pipelines, and Hazardous Materials
FROM: Staff, Subcommittee on Railroads, Pipelines, and Hazardous Materials
RE: Subcommittee Hearing on “*Pipeline Safety: Reviewing Implementation of the PIPES Act of 2020 and Examining Future Safety Needs.*”

I. PURPOSE

The Subcommittee on Railroads, Pipelines, and Hazardous Materials will meet on March 8, 2023, at 10:00 a.m. ET in 2167 Rayburn House Office Building to hold a hearing titled “*Pipeline Safety: Reviewing Implementation of the PIPES Act of 2020 and Examining Future Safety Needs.*” The purpose of this hearing is to examine the progress of the Pipeline and Hazardous Materials Safety Administration (PHMSA) in implementing the *Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2020* (P.L. 116-260, *PIPES Act of 2020*) and examining future needs in pipeline safety.

II. BACKGROUND

About the Agency

The Pipeline and Hazardous Materials Safety Administration (PHMSA) was created under the *Norman Y. Mineta Research and Special Programs Improvement Act of 2004* (P.L. 108-426, “*2004 Act*”). Prior to enactment of the *2004 Act*, the Department of Transportation’s (DOT) Research and Special Programs Administration administered the DOT’s pipeline and hazardous materials safety programs.¹ PHMSA’s mission is to protect people and the environment by advancing the safe transportation of energy through 3.4 million miles of natural gas and hazardous liquid pipelines, which account for the transportation of 65 percent of the energy commodities consumed in the United States. PHMSA also is charged with the safe and

¹ *Norman Y. Mineta Research and Special Programs Improvement Act of 2004*, Pub. L. No. 108-426 [hereinafter the *2004 Act*].

secure movement of over one million daily shipments of hazardous materials by all modes of transportation.²

The first statute regulating pipeline safety was the *Natural Gas Pipeline Safety Act of 1968*, which Congress amended in 1976.³ Congress added hazardous liquid pipelines to the statute in the *Pipeline Safety Act of 1970*.⁴ Recent enacted legislation regulating the safety of natural gas and hazardous liquid pipeline facilities for which mandates remain outstanding include the *Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016*, and the *Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2020*.⁵ The current authorization expires at the end of Fiscal Year (FY) 2023 on September 30, 2023.⁶

Pipeline Safety Framework

Safety regulations differ depending on the nature of the pipeline and the commodity that is moving through it. PHMSA's regulations govern pipelines and facilities that transport natural gas separately from those that transport hazardous liquid.⁷ Additionally, the pipelines and facilities used to transport natural gas and hazardous liquids vary in operating pressures, diameter size, intended purpose, and proximity to populated areas.⁸ This infrastructure includes:

- **Distribution pipelines:** These pipelines transport natural gas to commercial and residential end-users. Gas distribution pipelines tend to be smaller in diameter and operate at lower pressures.⁹ PHMSA estimates there are 2.3 million miles of gas distribution lines, much of which are intrastate pipelines.¹⁰ There are no hazardous liquid distribution pipelines.¹¹
- **Transmission pipelines:** These pipelines transport energy products from treatment and processing facilities to bulk customers, storage facilities, and local distribution networks.¹²

² See Pub. L. No. 117-58; see also PHMSA, *Pipeline Safety Program Budget and Grants Presentation (Jan. 25, 2023) (on file with Comm.)* [hereinafter *PHMSA Budget and Grants Presentation*].

³ *Natural Gas Pipeline Safety Act of 1968*, Pub. L. No. 90-481 (amended by the *Natural Gas Pipeline Safety Act Amendments of 1976*, Pub. L. No. 94-477, 90 Stat. 2073).

⁴ *Pipeline Safety Act of 1970*, Pub. L. No. 96-129.

⁵ *Pipeline Safety Reauthorization Act of 1988*, Pub. L. No. 100-561, 102 Stat. 2805; *Pipeline Safety Act of 1992*, Pub. L. No. 102-508, 106 Stat. 3289; *Accountable Pipeline Safety and Partnership Act of 1996*, Pub. L. No. 104-304, 110 Stat. 3793; *Pipeline Safety Improvement Act of 2002*, Pub. L. No. 107-355, 116 Stat. 1757; *The 2004 Act; Pipeline Inspection, Protection, Enforcement and Safety Act of 2006*, Pub. L. No. 109-468, 120 Stat. 3486; *Pipelines Safety, Regulatory Certainty, and Job Creation Act of 2011*, Pub. L. No. 112-90, 125 Stat. 1904; the *Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016*, Pub. L. No. 114-183, 130 Stat. 514; *Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2020*, Pub. L. No. 116-260 [hereinafter *PIPES Act of 2020*].

⁶ *PIPES Act of 2020*, § 101.

⁷ 49 C.F.R. §§ 192, 195 (2023).

⁸ *Id.*

⁹ PHMSA, *Fact Sheet: Distribution Pipelines*, available at <https://primis.phmsa.dot.gov/comm/FactSheets/FSDistributionPipelines.htm> (last updated Feb. 26, 2018).

¹⁰ *PHMSA Budget and Grants Presentation supra* note 2.

¹¹ GAO, GAO-12-388, PIPELINE SAFETY, COLLECTING DATA AND SHARING INFORMATION ON FEDERALLY UNREGULATED GATHERING PIPELINES COULD HELP ENHANCE SAFETY 3 (2022), available at <https://www.gao.gov/assets/gao-12-388.pdf>.

¹² PHMSA, *Fact Sheet: Transmission Pipelines*, available at <https://primis.phmsa.dot.gov/comm/FactSheets/FSTransmissionPipelines.htm> (last updated Jan. 2018).

The products transported can include natural gas and hazardous liquids¹³ Transmission pipelines can range in size from several inches to several feet in diameter and are designed to operate from relatively low pressures to high pressures.¹⁴ These lines can operate within a single State or span hundreds of miles, crossing one or more State lines.¹⁵ PHMSA estimates there are 301,484 miles of gas interstate transmission lines.¹⁶

- Gathering lines: These lines transport natural gas from the production site to a central collection point. PHMSA currently regulates 488,064 miles of gas gathering lines.¹⁷ Historically, gathering lines were built in lower populated areas, had smaller diameters than transmission lines, and operated at pressures and flow lower than transmission lines.¹⁸ However, as new gas development occurs around the country, regulators are considering the impacts of producers building larger diameter and higher pressure gathering lines and a growing national population.¹⁹
- Hazardous liquid pipelines: These pipelines transport liquid petroleum and other types of liquid energy from sources of origin to refineries and chemical plants, and in some cases to storage or distribution facilities.²⁰ According to PHMSA, hazardous liquids traverse the United States through approximately 260,000 miles of hazardous liquid pipelines.²¹ Hazardous liquids can include energy sources such as crude oil, refined petroleum products, highly volatile liquids, and anhydrous ammonia, and carbon dioxide in the supercritical (fluid or vapor) state.²² Hazardous liquids can be transported by transmission and gathering lines.²³
- Liquefied natural gas (LNG) facilities: These facilities are used for converting, transporting, or storing LNG. There are several Federal agencies involved in the regulation of LNG.²⁴ Historically, PHMSA has regulated peak shaving facilities and satellite facilities where LNG has been used to manage capacity during times of peak demand. PHMSA also

¹³ PHMSA, *Pipeline Miles and Facilities 2010+*, available at https://portal.phmsa.dot.gov/analytics/saw.dll?Portalpages&PortalPath=%2Fshared%2FPDM%20Public%20Website%2F_portal%2FPublic%20Reports&Page=Infrastructure (last updated Jan. 28, 2022) [hereinafter *Pipeline Miles*].

¹⁴ PHMSA, *Fact Sheet: Transmission Pipelines*, available at <https://primis.phmsa.dot.gov/comm/FactSheets/FSTransmissionPipelines.htm> (last updated Jan. 11, 2018).

¹⁵ PHMSA, *State Programs Overview*, available at <https://www.phmsa.dot.gov/working-phmsa/state-programs/state-programs-overview> (last updated Sep. 16, 2022) [hereinafter *State Programs Overview*].

¹⁶ *PHMSA Budget and Grants Presentation supra* note 2.

¹⁷ PHMSA, *Safety of Gas Gathering Pipelines* (Jan. 8, 2019), available at <https://primis.phmsa.dot.gov/meetings/FilGet.mtg?fil=1029>.

¹⁸ PHMSA, *Fact Sheet: Gathering Pipelines*, available at <https://primis.phmsa.dot.gov/comm/factsheets/fsgatheringpipelines.htm> (Jan. 12, 2018).

¹⁹ See PHMSA, Notice of Proposed Rulemaking, Pipeline Safety: Safety of Gas Transmission and Gathering Pipelines, 81 Fed. Reg. 29,830 (Apr 8, 2016.) available at <https://www.govinfo.gov/content/pkg/FR-2016-05-13/pdf/2016-11240.pdf>.

²⁰ Pipeline Safety Trust, *Hazardous Liquid Pipelines – Basics and Issues*, available at <https://pstrust.org/wp-content/uploads/2015/09/2015-PST-Briefing-Paper-03-HazLiquidBasics.pdf> (last updated Sept. 2015) [hereinafter *Hazardous Liquid Pipelines – Basics and Issues*].

²¹ PHMSA, *PHMSA Presentation: Pipeline Safety Program Budget and Grants*, (Jan. 25, 2023) (on file with Comm.); see also *Pipeline Miles*, *supra* note 13.

²² *Hazardous Liquid Pipelines – Basics and Issues*, *supra* note 20.

²³ *Id.*

²⁴ PHMSA, *Jurisdiction of LNG Plants*, available at <https://www.phmsa.dot.gov/pipeline/liquefied-natural-gas/jurisdiction-lng-plants> (last updated Jan. 31, 2018); see also 49 C.F.R. § 193.2001 (2023).

regulates import terminals.²⁵ Market changes led to a rapid growth in export terminals; however, PHMSA regulations governing LNG facilities predate such expansion.²⁶ In 2022, the United States became the world's top LNG exporter tied with Qatar.²⁷ To address these changes, the *PIPES Act of 2016 and the PIPES Act of 2020* mandated that PHMSA update its safety regulations for LNG facilities. PHMSA estimates it will complete this regulation by September 2023.²⁸

PHMSA's Pipeline Safety Oversight

PHMSA sets Federal minimum safety standards for pipeline safety functions, including developing, issuing, and enforcing regulations for the safe transportation of natural gas (including liquefied natural gas) and hazardous liquids by pipeline through the Office of Pipeline Safety (OPS).²⁹ The Agency's regulatory programs are focused on the design, construction, operation, and maintenance or abandonment of pipeline facilities, and in the construction, operation, and maintenance of LNG facilities.³⁰ The Agency has jurisdiction over transportation-related facilities; not drilling, siting, or production facilities.³¹

PHMSA has long-experienced difficulty in recruiting and maintaining an inspection workforce capable of meeting PHMSA's oversight needs, as it often competes with industry for personnel.³² As with previous reauthorization laws, the *PIPES Act of 2020* required PHMSA to ensure the number of pipeline inspection and enforcement personnel did not fall below certain levels (224 in FY 21, 235 in FY 22, and 247 in FY 23).³³ It also directed PHMSA to hire eight fulltime employees to finalize outstanding and new congressional mandates, and to seek OPM authority to use recruitment and retention incentives, such as special pay rates, coupled with continued service agreements, that similarly situated agencies have found effective at hiring and retaining staff.³⁴

²⁵ See PHMSA, *LNG Facility Siting*, available at <https://www.phmsa.dot.gov/pipeline/liquefied-natural-gas/lng-facility-siting>.

²⁶ 49 C.F.R. § 193.

²⁷ Stephen Stapczynski, *U.S. Surges to Top of LNG Exporter Ranks on Breakneck Growth*, BLOOMBERG, (Jan. 2, 2023), available at <https://www.bloomberg.com/news/articles/2023-01-03/us-surges-to-top-of-lng-exporter-ranks-on-breakneck-growth>.

²⁸ PHMSA, *PIPES Act Web Chart*, available at <https://www.phmsa.dot.gov/legislative-mandates/pipes-act-web-chart> (last updated Jan. 24, 2023) [hereinafter *Pipes Act Web Chart*].

²⁹ PHMSA, *Office of Pipeline Safety*, available at <https://www.phmsa.dot.gov/about-phmsa/offices/office-pipeline-safety> (last updated Dec. 13, 2018).

³⁰ PHMSA, *Pipeline Safety Regulations*, available at <https://primis.phmsa.dot.gov/comm/SafetyStandards.htm?nocache=8847>.

³¹ See PHMSA, *PHMSA Regulations*, available at <https://www.phmsa.dot.gov/regulations> (last updated May 5, 2021); see also FERC, *Natural Gas Pipelines*, available at <https://www.ferc.gov/industries-data/natural-gas/overview/natural-gas-pipelines> (last updated Feb. 10, 2021); see also Library of Cong., *Oil and Gas Industry: A Research Guide*, available at <https://guides.loc.gov/oil-and-gas-industry/laws/agencies>.

³² DOT INSPECTOR GENERAL, PHMSA HAS IMPROVED ITS WORKFORCE MANAGEMENT BUT PLANNING, HIRING, AND RETENTION CHALLENGES REMAIN 2 (2017), available at <https://www.oig.dot.gov/sites/default/files/PHMSA%20Workforce%20Final%20Report%20112117-ST2018010.pdf> [hereinafter PHMSA WORKFORCE REPORT].

³³ *PIPES Act of 2020*, *supra* note 5 § 102.

³⁴ *Id.*; see also PHMSA WORKFORCE REPORT, *supra* note 32.

When violations of PHMSA’s regulations occur, the Agency has several enforcement mechanisms it can use. These include the issuance of a warning letter, a notice of probable violation, or a corrective action order.³⁵ The Agency may also issue fines for non-compliance.³⁶ In 2022, PHMSA closed 227 enforcement cases.³⁷

States’ Pipeline Safety Oversight

PHMSA supports states’ oversight work by authorizing states to assume certain aspects of pipeline safety for intrastate gas pipelines, hazardous liquid pipelines, and underground natural gas storage through certifications and agreements with PHMSA under 49 U.S.C. §§ 60105 and 60106(a). The Agency also authorizes states with certifications to participate in the oversight of interstate pipeline transportation through agreements under 49 U.S.C. § 60106(b). States with certified pipeline safety programs may impose additional standards for intrastate pipelines and facilities so long as they are compatible with the minimum Federal standards issued by PHMSA.³⁸

Cybersecurity

Regarding cybersecurity, PHMSA signed an annex to its Memorandum of Understanding (MOU) with the Transportation Security Administration (TSA) that identifies TSA as the lead entity for pipeline security, which has included cybersecurity threats.³⁹ In May 2021, the Colonial Pipeline sustained a ransomware attack, causing the operator to shut down the pipeline for six days.⁴⁰ PHMSA issued a Notice of Probable Violation (NOPV) and Proposed Compliance Order, and proposed civil penalties of \$986,400. The NOPV alleges that failures to adequately plan and prepare for a manual restart and shutdown operation contributed to the national impacts when the pipeline remained out of service after the May 2021 cyberattack.⁴¹

³⁵ See 49 C.F.R. § 190.205 (2023) (allowing for letter notifying an operator of alleged violations and directs them to correct the violation or be subject to additional enforcement action); 49 C.F.R. § 190.207 (2023) (providing for a Regional Director to serve a notice—commonly issued after routine inspections, incident investigations, and other activity—alleging specific regulatory violations and proposing remedial action or civil penalties); 49 C.F.R. § 190.233 (2023) (providing for the Associate Administrator to issue an order finding a particular situation represents a serious hazard to life, property, or the environment and directing certain actions to be taken, up to and including shutdown of the pipeline system).

³⁶ See PHMSA, *Civil Penalty Summary*, available at <https://www.phmsa.dot.gov/regulatory-compliance/pipeline/enforcement/civil-penalty-summary> (last updated Jan. 25, 2023).

³⁷ See PHMSA, *Listing of Cases Initiated*, available at https://primis.phmsa.dot.gov/comm/reports/enforce/CasesOpen_opid_0.html?nocache=745#_TP_1_tab_2.

³⁸ *State Programs Overview*, *supra* note 16.

³⁹ PHMSA, ANNEX TO THE MEMORANDUM OF UNDERSTANDING BETWEEN THE DEPARTMENT OF HOMELAND SECURITY AND DOT CONCERNING TSA AND PHMSA COOPERATION ON PIPELINE TRANSPORTATION SECURITY AND SAFETY (Feb. 2020), available at <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/regulatory-compliance/phmsa-guidance/73466/phmsa-tsa-mou-annexexecuted.pdf>.

⁴⁰ Vanessa Romo, *Panic Drives Gas Shortages After Colonial Pipeline Ransomware Attack*, NPR, (May 11, 2021), available at <https://www.npr.org/2021/05/11/996044288/panic-drives-gas-shortages-after-colonial-pipeline-ransomware-attack>.

⁴¹ Letter from Gregory Alan Ochs, Dir., Central Region, Off. of Pipeline Safety, PHMSA to Joseph A. Blount, President and Chief Executive Officer, Colonial Pipeline Company (May 5, 2022) (notifying of probable violation, proposed civil penalty, and proposed compliance order), available at

III. PIPELINE SAFETY LEGISLATION

In 2021 and 2022, PHMSA finalized seven mandates, including four from the *PIPES Act of 2011*: Safety of Gas Transmission Pipelines; Discretionary Integrity Management Improvements; Safety of Gas Gathering Pipelines; Amendments to Parts 192 and 195 to require Valve Installation and Minimum Rupture Detection Standards.⁴² These final rules completed congressional responses to catastrophic pipeline failures, such as the fatal explosion of a gas transmission pipeline in San Bruno, California in 2010 and the release of one million barrels of crude oil near Marshall, Michigan in 2010.⁴³ PHMSA also issued an interim final rule on Coastal Ecological Unusually Sensitive Areas, a mandate from the *PIPES Act of 2016* and the *PIPES Act of 2020*.⁴⁴ One mandate from the *PIPES Act of 2016* is outstanding: finalizing updates to regulations governing LNG facilities.⁴⁵

In 2020, Congress enacted the *PIPES Act of 2020*, which directed PHMSA to:

- Determine whether to issue a notice of proposed rulemaking on class location change requirements and to advance the rulemaking process if it makes a positive determination;⁴⁶
- Frequently report publicly on progress made toward completing outstanding mandates;⁴⁷
- Update distribution pipeline safety regulations in response to the September 2018 distribution pipeline explosions in the Merrimack Valley region of Massachusetts;⁴⁸
- Prioritize completion of a final rulemaking on gas gathering lines and direct GAO to study capabilities of mapping gathering lines;⁴⁹
- Strengthen whistleblower protections;⁵⁰

https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-05/32022026_Colonial_Pipeline_NOPV_PCP_PCO_05052022.pdf.

⁴² Pipeline Safety: Safety of Gas Transmission Pipelines: Repair Criteria, Integrity Management Improvements, Cathodic Protection, Management of Change, and Other Related Amendments, 87 Fed. Reg. 52,224 (Aug. 24, 2022), *available at* <https://www.federalregister.gov/documents/2022/08/24/2022-17031/pipeline-safety-safety-of-gas-transmission-pipelines-repair-criteria-integrity-management>; Pipeline Safety: Safety of Gas Gathering Pipelines: Extension of Reporting Requirements, Regulation of Large, High-Pressure Lines, and Other Related Amendments: Response to a Petition for Reconsideration; Technical Corrections; Issuance of Limited Enforcement Discretion, 87 Fed. Reg. 26,296, *available at* <https://www.federalregister.gov/documents/2022/05/04/2022-09474/pipeline-safety-safety-of-gas-gathering-pipelines-extension-of-reporting-requirements-regulation-of>; Pipeline Safety: Requirement of Valve Installation and Minimum Rupture Detection Standards, 87 Fed. Reg. 20,940 (Apr. 8, 2022), *available at* <https://www.federalregister.gov/documents/2022/04/08/2022-07133/pipeline-safety-requirement-of-valve-installation-and-minimum-rupture-detection-standards>.

⁴³ *Id.*

⁴⁴ *Pipes Act Web Chart*, *supra* note 28.

⁴⁵ *PIPES Act of 2016*, Pub. L. No. 114-183, § 27, 130 Stat. 514; *PIPES Act of 2020*, Pub. L. No. 116-260, § 110, 134 Stat. 620; See OFF. OF INFO. AND REGULATORY AFFAIRS, PHMSA, DOT, *Pipeline Safety: Amendment to Liquefied Natural Gas facilities* (2018), *available at* <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=2137-AF45>.

⁴⁶ *PIPES Act of 2020*, *supra* note 5, § 115.

⁴⁷ *Id.* § 106.

⁴⁸ *Id.* at Title II.

⁴⁹ *Id.* § 112.

⁵⁰ *Id.* § 116.

- Update its current regulations for large-scale LNG facilities and allowing it to establish an LNG Center of Excellence;⁵¹
- Issue regulations prescribing the applicability of pipeline safety requirements to certain idled pipelines;⁵²
- Create a technology pilot program, which allows pipeline operators to test and evaluate innovative technologies or practices on their systems that improve pipeline safety;⁵³
- Enter into agreement with the National Academies of Science to study potential methods or standards for installing automatic or remote-controlled shut-off valves on pipelines located in certain sensitive areas;⁵⁴
- Issue regulations directing distribution, transmission, and gathering pipeline operators to conduct leak detection and repair programs that protect the environment and pipeline safety, requiring use of advanced leak detection technologies;⁵⁵
- Require broader transmission of safety-related condition reports to include state authorities, Tribes, and emergency response and planning entities;⁵⁶ and
- Prioritize a rulemaking to protect unusually sensitive areas and require operators of certain hazardous liquid pipelines to use internal inspection technology at least once every 12 months and establish procedures for assessing potential impacts by marine vessels.⁵⁷

IV. FUTURE NEEDS IN PIPELINE SAFETY

Pipeline safety incidents

PHMSA reports that in 2022, 631 pipeline incidents occurred, from which 10 individuals died, 24 were injured, and property damages totaled more than \$685 million.⁵⁸ Of these incidents, 17 were classified as serious and 267 were significant.⁵⁹

Carbon Dioxide Pipeline Transportation

There are approximately 5,000 miles of pipeline transporting CO₂ primarily for enhanced oil recovery.⁶⁰ Carbon capture, utilization, and sequestration (CCUS) is a process that captures CO₂ emissions from sources, such as power plants, and either reuses or stores it so it will not

⁵¹ *Id.* §§ 110, 111.

⁵² *Id.* § 109.

⁵³ *Id.* § 104.

⁵⁴ *Id.* § 119.

⁵⁵ *Id.* §§ 113, 114.

⁵⁶ *Id.* § 121.

⁵⁷ *Id.* § 120.

⁵⁸ PHMSA, *Pipeline and Hazardous Materials Administration Pipeline Safety Incidents 20 Year Trends*, available at

https://portal.phmsa.dot.gov/analytics/saw.dll?Portalpages&PortalPath=%2Fshared%2FFPDM%20Public%20Website%2F_portal%2FSC%20Incident%20Trend&Page=All%20Reported [hereinafter *PHMSA 20 Year Trends*].

⁵⁹ *Id.* (explaining Serious incidents involve a fatality or injury requiring in-patient hospitalization and that significant incidents involve a fatality or injury requiring in-patient hospitalization, \$50,000 or more in total costs, highly volatile liquid releases of five barrels or more or other liquid release of 50 barrels or more, or liquid releases resulting in an unintentional fire or explosion).

⁶⁰ PAUL W. PARFOMAK, CONG. RSCH. SERV., IN1944, CARBON DIOXIDE PIPELINES: SAFETY ISSUES, (2022), available at <https://crsreports.congress.gov/product/pdf/IN/IN1944>.

enter the atmosphere.⁶¹ The *Infrastructure Investment and Jobs Act* (P.L. 117-58) establishes a Carbon Dioxide Transportation Infrastructure Finance and Innovation (CIFIA) program for CO₂ pipelines and authorizes \$2.1 billion over five years for low-interest CIFIA loans and grants through the Department of Energy (DOE).⁶²

CO₂ can be transported in various states. Currently, nearly all CO₂ is transported in a supercritical state (a dense fluid or vapor phase between a liquid and gas) and is regulated under 49 CFR Part 195.⁶³ Future carbon capture and sequestration (CCS) pipeline projects may be transported in a subcritical state (a liquid) or a gas.⁶⁴ PHMSA hazardous liquid regulations address CO₂ that is transported as a fluid compressed to a supercritical state and is 90% pure CO₂.⁶⁵ The potential future use of CO₂ with higher levels of impurities which may be transported as a liquid or gas are not regulated by PHMSA.

CO₂ is colorless and odorless and in concentrations is an asphyxiant, displacing the oxygen in air and causing negative health impacts.⁶⁶ On February 22, 2020, in Satartia, Mississippi, Denbury's 24-inch Delhi Pipeline ruptured, releasing liquid CO₂ that immediately began to vaporize.⁶⁷ 200 people surrounding the rupture location were evacuated, and 45 people were taken to the hospital.⁶⁸ PHMSA's investigation identified contributing factors to the accident, including lack of assessment of geohazards in plans and procedures, underestimating the potential affected areas that could be impacted by a release in its CO₂ dispersion model, and not notifying local responders to advise them of a potential failure.⁶⁹

Hydrogen Pipeline Transportation

As of December 2020, there were 1,608 miles of hydrogen pipeline in the United States, primarily on the Gulf Coast.⁷⁰ Today, almost all hydrogen is consumed by the oil industry or chemical industry; however, hydrogen pipeline expansion may occur to coincide with emerging hydrogen hubs that offer hydrogen to end users for purposes such as mobility, goods movement,

⁶¹ DOE, *Carbon Capture, Utilization & Storage*, available at <https://www.energy.gov/carbon-capture-utilization-storage>.

⁶² *Infrastructure Investment and Jobs Act*, Pub. L. No. 117-58, Division D, 135 Stat. 429, 923.

⁶³ DOE, MEETING THE DUAL CHALLENGE, A ROADMAP TO AT-SCALE DEPLOYMENT OF CARBON CAPTURE, USE, AND STORAGE 6-4 (2019), available at <https://www.energy.gov/sites/default/files/2021-06/2019%20-%20Meeting%20the%20Dual%20Challenge%20Vol%20III%20Chapter%206.pdf>.

⁶⁴ RICHARD B. KUPREWICZ, ACCUFACTS' PERSPECTIVES ON THE STATE OF FEDERAL CARBON DIOXIDE TRANSMISSION PIPELINE SAFETY REGULATIONS AS IT RELATES TO CARBON CAPTURE, UTILIZATION, AND SEQUESTRATION WITHIN THE U.S., PREPARED FOR PIPELINE SAFETY TRUST 4 (2022), available at <https://pstrust.org/wp-content/uploads/2022/03/3-23-22-Final-Accufacts-CO2-Pipeline-Report2.pdf> [hereinafter ACCUFACTS PERSPECTIVES].

⁶⁵ 49 C.F.R. § 195.2.

⁶⁶ ACCUFACTS PERSPECTIVES, *supra* note 64.

⁶⁷ PHMSA FAILURE INVESTIGATION REPORT, DENBURY GULF COAST PIPELINES, LLC, available at <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-05/Failure%20Investigation%20Report%20-%20Denbury%20Gulf%20Coast%20Pipeline.pdf>.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ PAUL W. PARFOMAK, CONG. RSCH. SERV., R46700, PIPELINE TRANSPORTATION OF HYDROGEN: REGULATION, RESEARCH, AND POLICY (2021), available at <https://crsreports.congress.gov/product/pdf/R/R46700>.

heat for manufacturing processes, and other services.⁷¹ Some United States pipeline operators have initiated projects to blend hydrogen and methane in natural gas pipelines.⁷²

V. **WITNESESS**

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⁷¹ MARTIN C. OFFUTT, CONG. RSCH. SERV., R47289, HYDROGEN HUBS AND DEMONSTRATING THE HYDROGEN ENERGY VALUE CHAIN, (2022), *available at* <https://crsreports.congress.gov/product/pdf/R/R47289>.

⁷² *Id.*